http://tragerwaterreport.files.wordpress.com/2010/05/san_francisco_bay_aerial_view-and-golden-gate-bridge.jpg

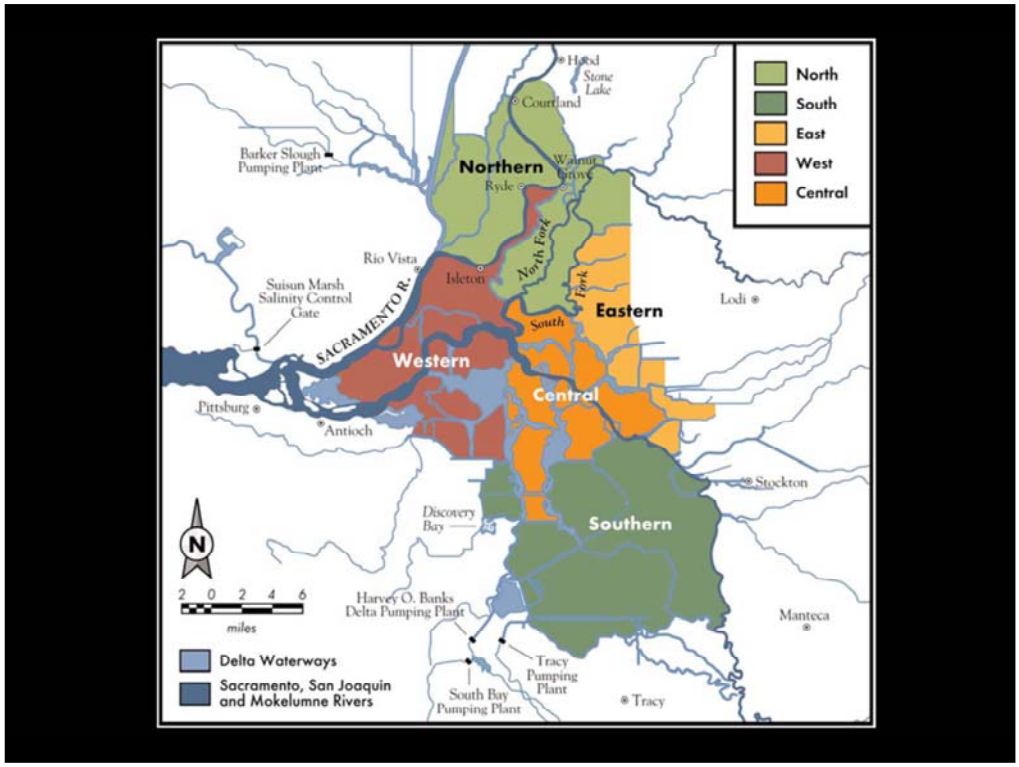
Appears to show upwelling and outflow of turbid water.


PARTNERS & STAKEHOLDERS
WATER SUPPLY
ECOSYSTEM RESTORATION
FLOOD RISK REDUCTION
SWC
Native Americans
SWRCB
BDCP
Sport & Commercial Fishermen
NHI
SCVWD
DSC
Farm Bureau
DFG
DBW
Bay Institute
NDWA
EPA
FOR
Westlands
BOR
DOI
KCWA
EDF
CA Natural Resources Agency
NMFS
Mirant Delta
USDA
The Nature Conservancy
Irrigation Districts
Farmers
FWS
CCWD
DWR
USACE
Defenders of Wildlife
ACWA
CVFPB
SLD-MWA
MWD
American Rivers
Reclamation Districts
SAFCA
SJAFCA
DCC
BCDC
Zone 7 WA
Conservation Districts
Counties
CNRFC
BPC
Flood Control Agencies
NWS
CAL EMA
FEMA
Cities & Towns
Federal
State
Local
NGO's
Other
5
BUILDING STRONG®

Inverted river delta – one of only a few worldwide

Only one free-flowing river remains in the Central Valley (Cosumnes) – only three free-flowing rivers statewide (Smith River, Santa Mararita River)

Shasta Dam: Craig Miller (Vox/Terra):
http://picasaweb.google.com/107521149717650730589/MainstemSacramentoRiverWatershed?feat=embedwebsite#5516132433161550914
http://picasaweb.google.com/107521149717650730589/MainstemSacramentoRiverWatershed#
Central Valley Project (CVP) was completed in 1940 as part of the New Deal: Contra Costa Canal and Delta Cross Channel transferred Sacramento River water to the Bill Jones Pumping Plant. Friant Dam blocked the San Joaquin River.
State Water Project (SWP) was completed in 1967: diverted Feather River across Delta channels to Harvey O. Banks pumping facility.

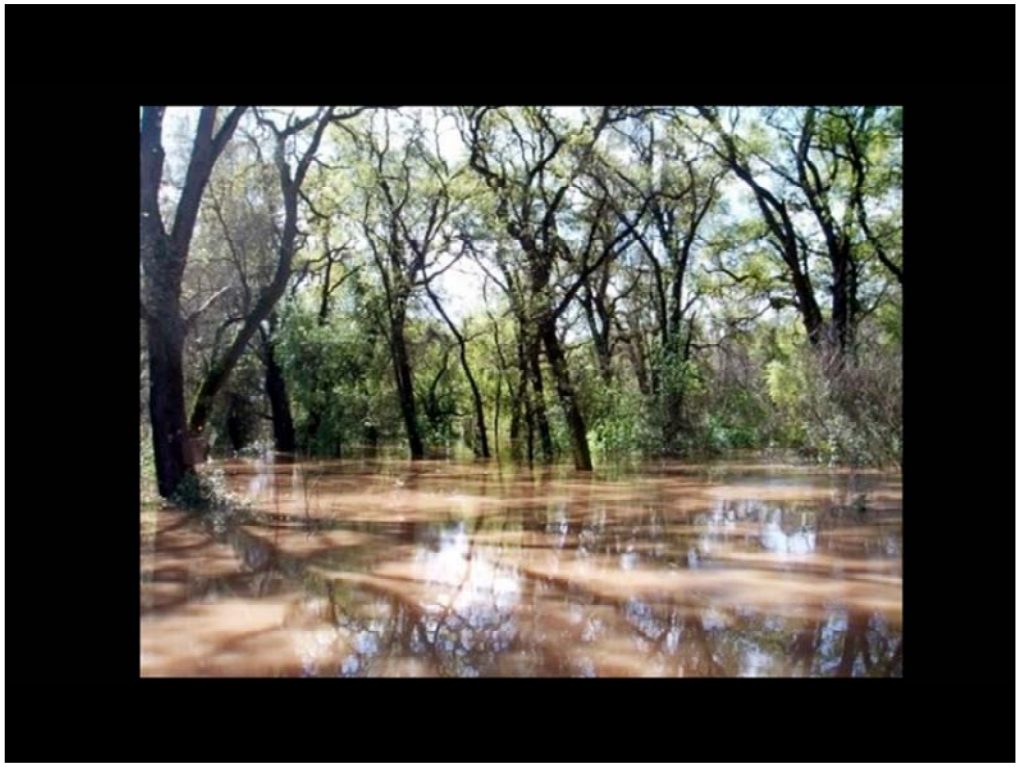


Mount & Twiss (2005)
This figure re-printed from *Envisioning Futures for the Sacramento-San Joaquin Delta* (page 49).
http://www.ppic.org/content/pubs/report/R_207JLChapter3R.pdf

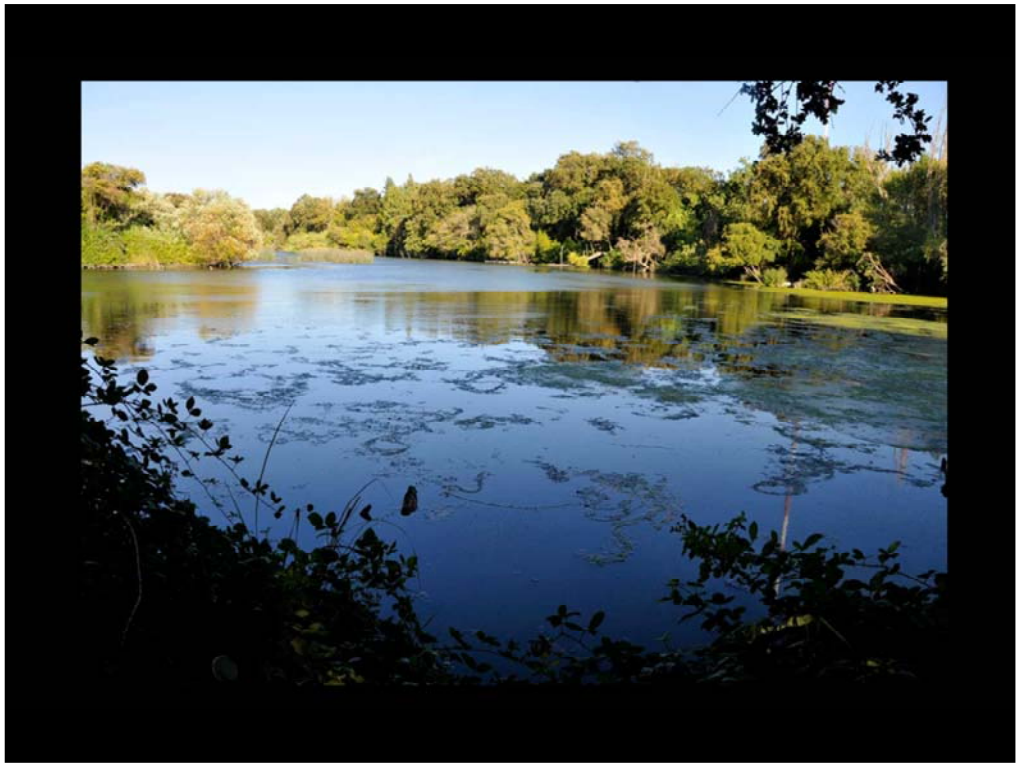
For more than 6,000 years, the Delta was a freshwater tidal marsh consisting of a complex network of tidal channels, sloughs, "islands" composed of tule marsh plains, complex branching ("dendritic") water channels, and natural levees colonized by riparian forests. A slow rise in sea level and gradual regional tectonic subsidence (subsidence of the land resulting from flexure of the Earth's crust) created what geologists refer to as "accommodation space" and made room for the relatively continuous accumulation of large volumes of sediment within the Delta. As accommodation space was formed by sea level rise over the last 6,000 years, it was quickly filled by the deposition of inorganic sediment from the Sacramento and San Joaquin Rivers and a similar amount of *in situ* production of organic material in the tule marshes. The preservation of

this material, as the peat soils of the Delta, benefited from the oxygen-poor conditions within saturated soils of the marshes.

PPIC "*Envisioning*" book, pages 44-45

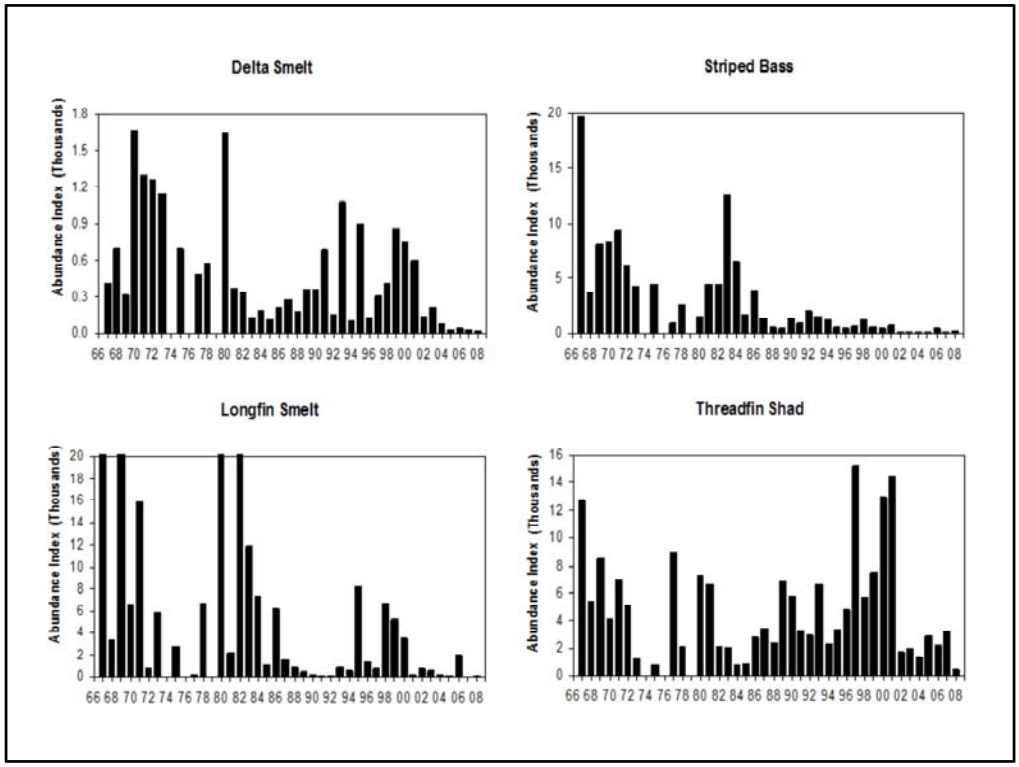


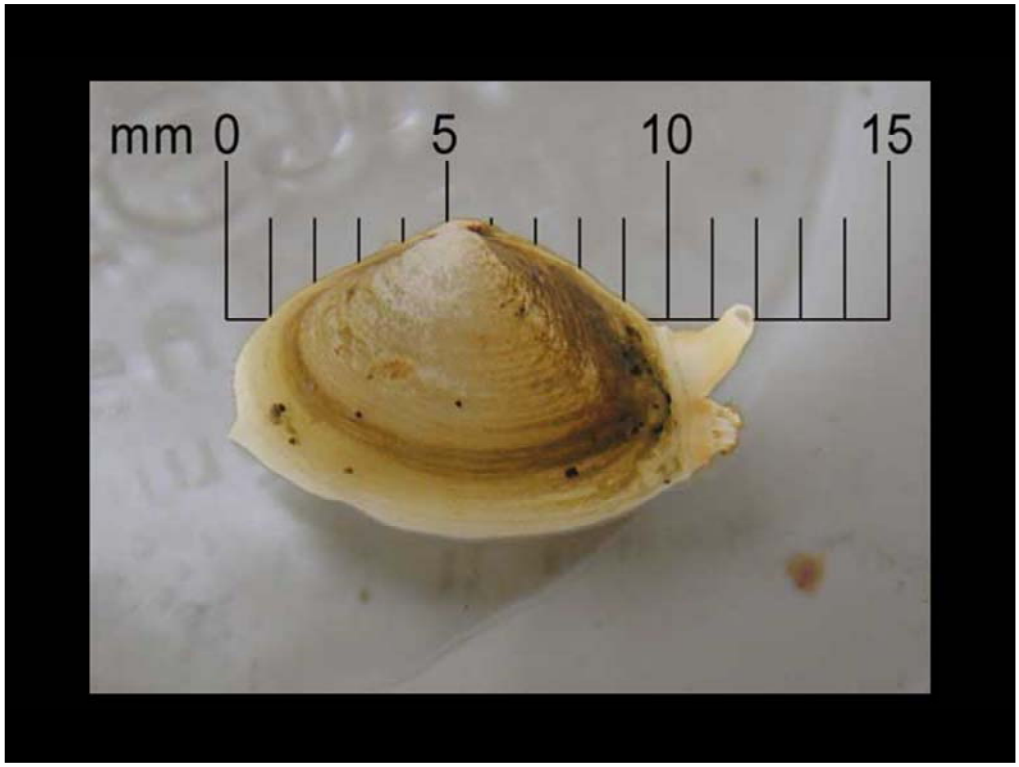
The rivers meet in the Delta before flowing to the San Francisco Bay and Pacific Ocean. Prior to 1850, the vast areas of wetlands and narrow river channels kept much of the floor of the valley as a slowly draining inland sea.



Delta Meadows State Park: http://www.sskpc.org/delta_meadows_state_park.htm
http://www.sskpc.org/Photos/Delta-Meadows-St-Park-038.jpg

Harvey O. Banks Pumping Plant. State Water Project. Image courtesy of San Diego County Water Authority
http://www.sdcwa.org/sites/default/files/images/baydelta_harveybankspumpingplant_aerial_hires.jpg


Delta Smelt
Abundance Index (Thousands)
0.0
0.3
0.6
0.9
1.2
1.5
1.8
66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 00 02 04 06 08
Striped Bass
Abundance Index (Thousands)
0
5
10
15
20
66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 00 02 04 06 08
Longfin Smelt
Abundance Index (Thousands)
0
2
4
6
8
10
12
14
16
18
20
66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 00 02 04 06 08
Threadfin Shad
Abundance Index (Thousands)
0
2
4
6
8
10
12
14
16
66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 00 02 04 06 08



The overbite clam, *Corbula amurensis*.

http://science.calwater.ca.gov/publications/sci_news_0809_clams.html

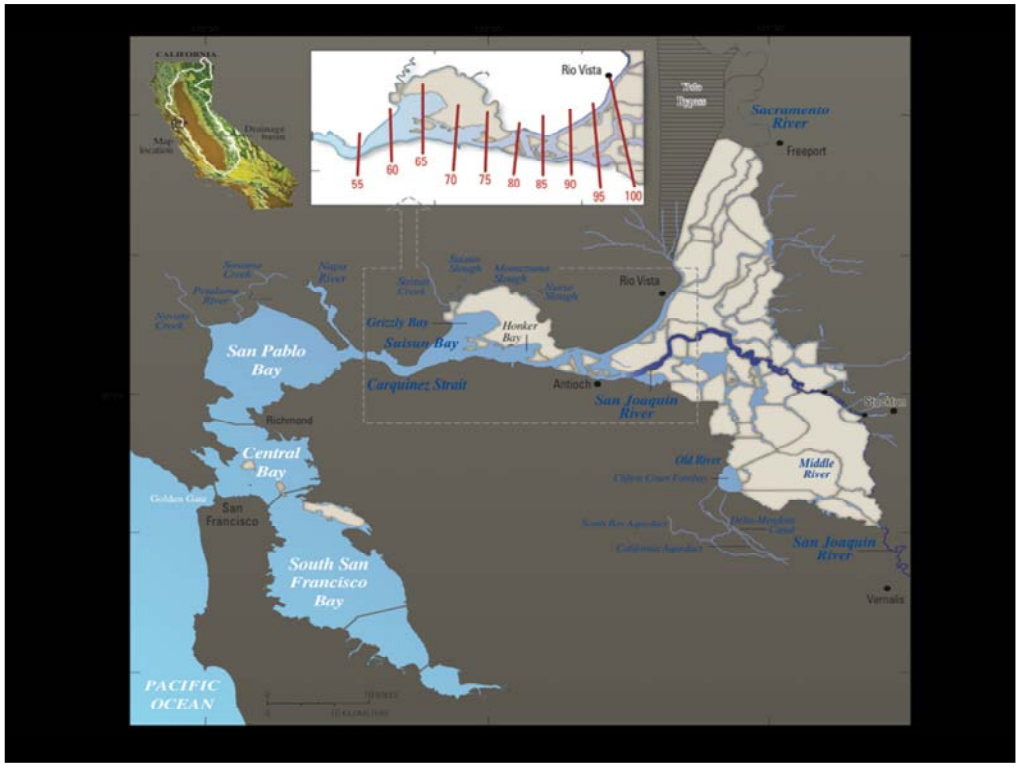
http://www.exoticsguide.org/

Historically, most energy and carbon in the Bay Delta flowed through pelagic zooplankton and fish; currently most energy and carbon flow instead through the alien overbite clam which became established in 1986 (PPIC, Envisioning, p. 71).

The San Francisco Bay–Delta is arguably one of the most invaded estuaries in the world. More than 250 alien species of aquatic and terrestrial plants and animals have entered the estuary since the first arrival of Europeans, and at least 185 alien species now inhabit the Delta and have profoundly changed Bay-Delta food webs and habitats, generating an array of effects—mostly negative—on native species. Today and for the indefinite future, we are managing an ecosystem composed of a mix of native and alien species that are in constant flux, as native species decline in abundance, new alien species invade, and established aliens wax and wane. *Alien species are a major and growing problem that significantly inhibits our ability to manage the Bay Delta in support of desirable species*.

in numbers. PPIC "*Envisioning*" book pages 54-55; 71.

http://www.ppic.org/content/pubs/report/R_207JLChapter3R.pdf



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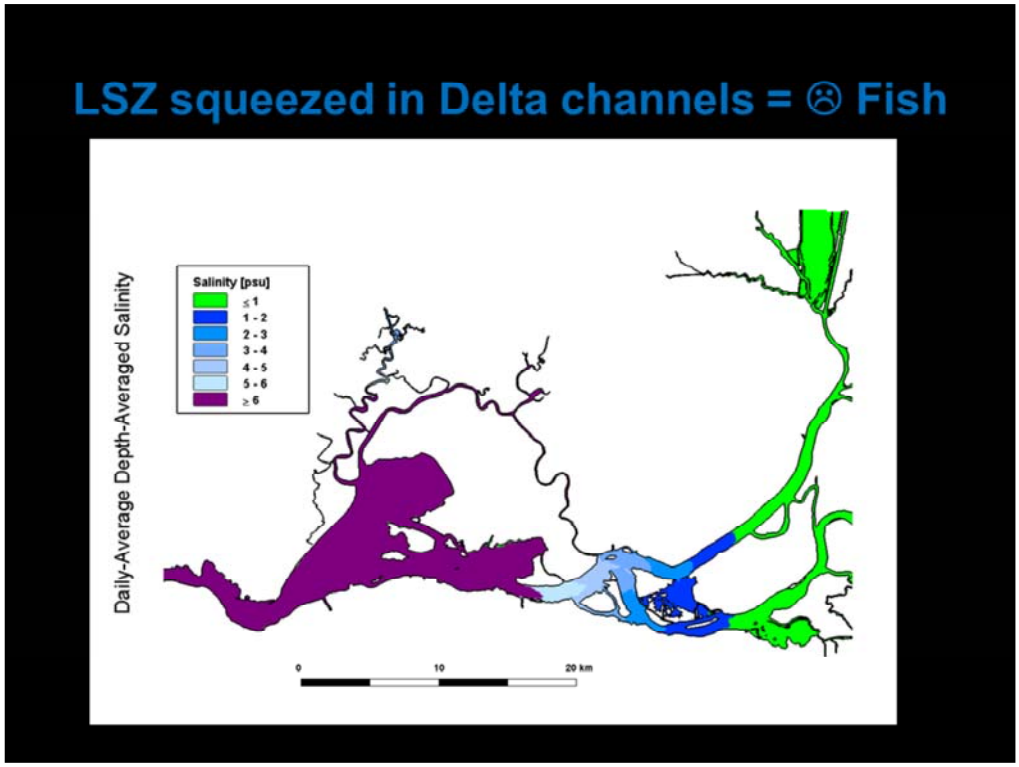
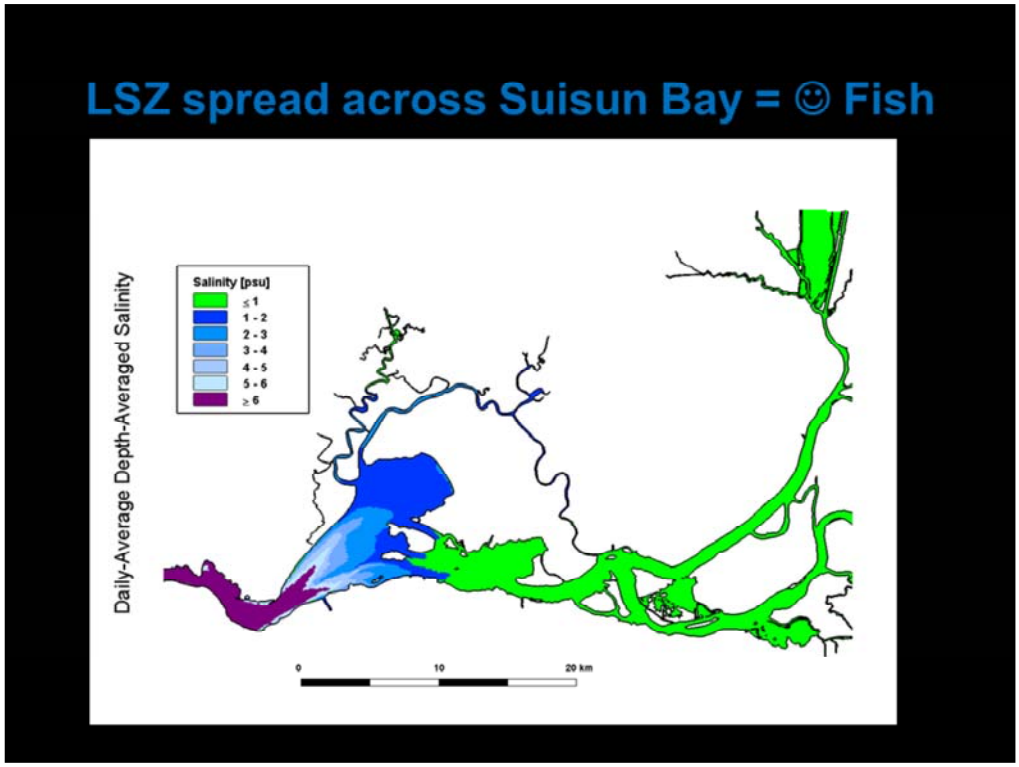
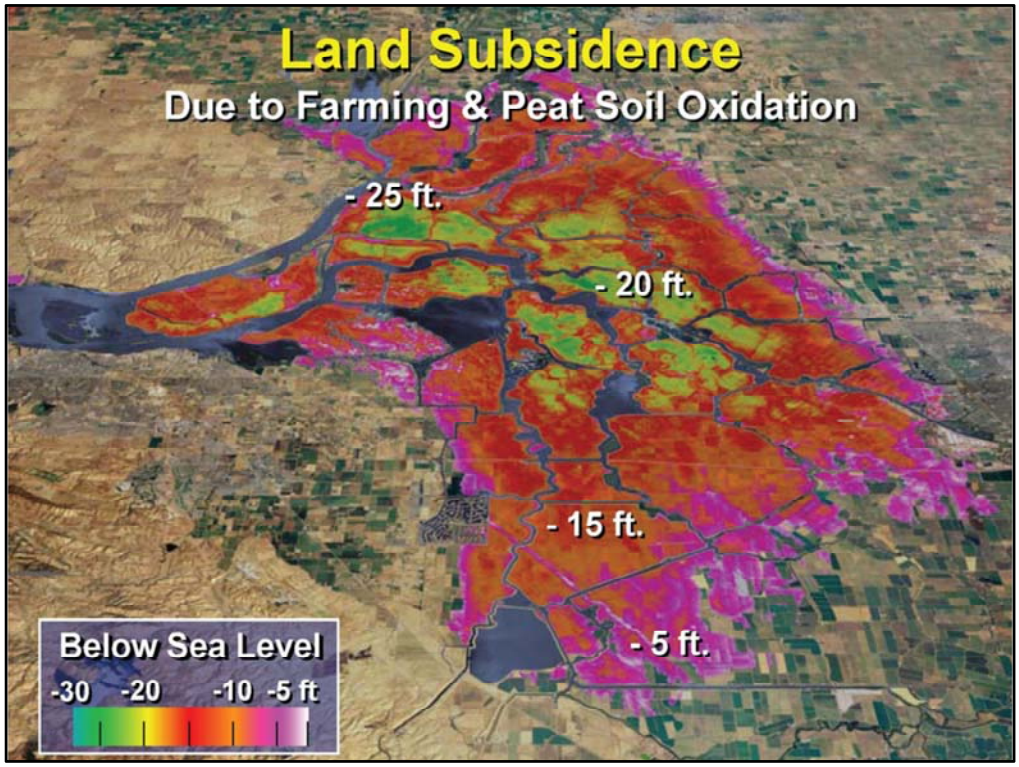
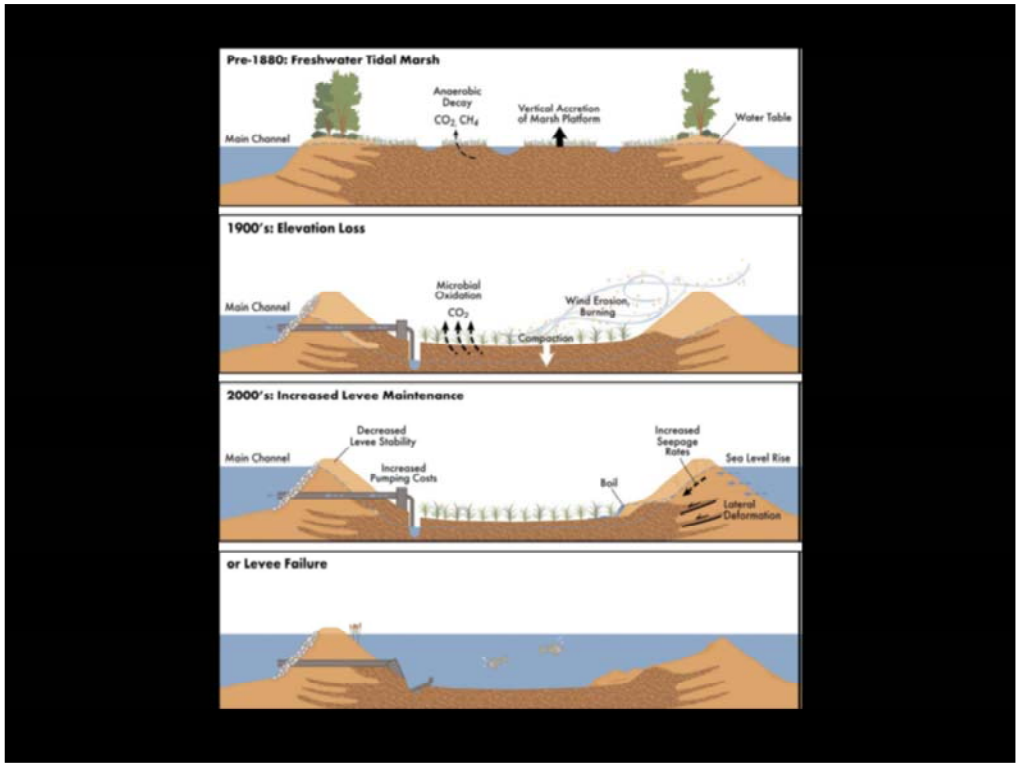


When X2 = 85 km, the isohaline approaches Antioch and all connections to Suisun Bay and Marsh are lost. A relatively high salinity zone moves into Suisun, Grizzly, and Honker bays; and the areal extent of estuarine habitat drops to 4262 hectares. For years, under the current regulatory regime, the X2 position has been maintained at 85 km during the fall season, and these environmentally-unfavorable salinity conditions have prevailed.



When X2 = 65 km below Roe Island, the low salinity zone (in shades of blue from 1-6 psu or ppt) stretches across the broadest regions of Suisun Bay adjacent to Suisun Marsh and covers 7704 hectares.


Land Subsidence
Due to Farming & Peat Soil Oxidation
- 25 ft.
- 20 ft.
- 15 ft.
- 5 ft.
Below Sea Level
-30 -20 -10 -5 ft



Conceptual diagram illustrating evolution of Delta islands due to levee construction and island subsidence. Modified from Ingebritsen et al. (2000). Mount and Twiss: http://deltarevision.com/2005_docs/Subsidence,%20Sea%20Level%20Rise,%20and%20Seismicity%20in%20the%20Sacramento-San%20Joaquin%20Delta.pdf

Most levees were built in the 1800s by Chinese laborers who converted much of the Delta marshlands were "reclaimed" for farmland. The levees were not designed for long-term flood protection of homes and infrastructure.

2004 levee break at Jones Tract flooded 12,000 acres. Aquafornia.
http://aquafornia.com/archives/category/levees/page/3

We're waiting…